

Attachment 5: Work Plan

PROJECT PURPOSE, GOALS, AND OBJECTIVES

The goals of this project: PCE Contamination Assessment, Central Bernal Subbasin are:

- Goal 1: Identify aquifers impacted by PCE.
- Goal 2: Use the information collected on the areal and vertical extent of PCE contamination to plan future needed municipal supply well sites and design.
- Goal 3: Identify probable source of PCE contamination in the Bernal Subbasin for follow-up by the Regional Water Quality Control Board.

DESCRIPTION OF WORK

The proposed scope of work is divided into four main tasks. The tasks and their subtasks are:

TASK 1: Preparation

- Subtask 1.1: Research Potential Source Locations
- Subtask 1.2: Select Passive Soil Gas and CPT/MIP Locations
- Subtask 1.3: Request for Bids and Contractor Selection
- Subtask 1.4: Permitting
- Subtask 1.5: Environmental Compliance/CEQA

TASK 2: Field Work

- Subtask 2.1: Passive Soil Gas Survey
- Subtask 2.2: CPT/MIP Survey
- Subtask 2.3: Groundwater Sampling
- Subtask 2.4: Well Profiling Survey of Supply Well

Waste Handling

TASK 3: Data Management/Interpretation

- Subtask 3.1: Laboratory Analyses
- Subtask 3.2: Database Management
- Subtask 3.3: Map Vertical and Areal PCE Distribution
- Subtask 3.4: Progress Meetings with RWQCB and Property Owner

TASK 4: Project Management/Public Outreach

- Subtask 4.1: Project Management
- Subtask 4.2: Public Outreach
- Subtask 4.3: Schedule and Budget Management
- Subtask 4.4: Information Dissemination
- Subtask 4.5: Project Deliverables

A detailed description of the work items to be performed for each task is presented below:

TASK 1: PREPARATION

Subtask 1.1: RESEARCH POTENTIAL SOURCE LOCATIONS

A Phase One Environmental Site Assessment (ESA) report is typically prepared for a real estate holding that identifies potential or existing environmental contamination liabilities. This type of assessment is conducted to meet or exceed the ASTM-E-1527 standard for site inspection, research, and reporting. Zone 7 does not deem it necessary to conduct a complete Phase I ESA for all sites located up gradient to the impacted well. However, the research portion of a Phase I ESA would be useful to conduct prior to the commencement of field work.

Any available historical information would confirm past use and guide fieldwork to the appropriate sites. A search through available current and historic records will be conducted in an attempt to identify other active and former businesses that might have utilized PCE in their normal course of business, and may have discharged a significant quantity to the environment. The search will target potential PCE using businesses such as: dry cleaners, auto repair shops, metal plating shops, semi-conductor manufacturers, and chemical producers. A commercial records search service will be utilized for this initial task. Some of the possible records that will be researched include government databases of known discharges, hazardous materials storage plan holders, city directories, historic Sanborn fire insurance maps, and proprietary industry-specific databases kept by the service provider.

Subtask 1.2: SELECT PASSIVE SOIL GAS AND CPT/MIP LOCATIONS

The selection of Passive Soil Gas (PSG) Survey locations will be based on historical information gathered from Task 1.1 as well as current site use. Since the City of Pleasanton supports this effort, Zone 7 will collect PSG samples along the public right of way immediately adjacent to each of the former or active dry cleaners, with five samples per dry cleaner and 10 to 20 feet between sample locations, for a total of 50 sample locations. The final number of sample locations will be based on additional site information, sample location access, and the project budget.

Cone penetrometer (CPT) borings with membrane interface probe (MIP) locations will be selected based on results from the PSG Survey. Keeping to the public right of way, CPT/MIP locations will be selected in areas indicated by the highest contamination levels from the survey. Zone 7 will plan for a total 30 locations for the borings. If a particular site indicates no PCE above detection limits, further investigation will not be necessary. Conversely, higher or varied levels of PCE could warrant closer investigation for a site. The anticipated borehole locations will also be finalized with guidance from the PSG Survey laboratory and the drilling contractor.

Subtask 1.3: REQUEST FOR BIDS AND CONTRACTOR SELECTIONS

Zone 7 will prepare contract specifications for the proposed project, and will adhere to the requirements of the Public Contract Code to obtain a contractor.

The PSG contractor selected will have the capabilities to provide all necessary sampling kits and analytical testing for samples collected. The PSG contractor will also have all field equipment required to install samplers and instruct Zone 7 personnel on proper sample retrieval methods.

The drilling contractor will have the technical capabilities to advance the proposed CPT/MIP borings and collect grab groundwater samples.

Subtask 1.4: PERMITTING

The locations of the soil gas samples and CPT/MIP borings will be kept to the City of Pleasanton right-of-way. The impacted well is located the Alameda County Fairgrounds. Zone 7 will obtain the appropriate encroachment permits and permissions to enter and perform work from the Alameda County Fairgrounds for the testing and sampling.

Zone 7 will contact Underground Services Alert (USA) prior to boring at each location to identify any potential utilities that may be at each site. In addition, Zone 7 will work with the property owner/operator to identify any other underground facilities or hazards that may be present at each location.

Subtask 1.5: ENVIRONMENTAL COMPLIANCE/CEQA

The project is likely categorically exempt under Section 15306, "Information Collections" of the California Public Resources Code. The proposed project consists of installing temporary probes to collect data. All equipment will be removed and the remaining void space will be sealed. A Notice of Exemption Form will be completed and filed with the Alameda County Clerk Recorder.

The passive soil gas probe installation and removal, the CPT boring advancement, and the collection of groundwater samples will comply with the provisions of the Clean Water Act that require best management practices will be in place to prevent discharge of pollutants into waters of the U.S. and waters of the State. A Stormwater Quality Protection Plan that outlines the applicable best management practices during construction will be completed prior to start of the construction.

TASK 2: FIELD WORK

Subtask 2.1: PASSIVE SOIL GAS SURVEY

Zone 7 will collect PSG samples from the subsurface adjacent to sites of potential PCE sources identified in Subtask 1.1. Approximately, five samples per site will be assessed. This proposal assumes 50 samplers will be deployed for the project. The sample results will provide data on the relative concentrations of PCE for each site. Field staff will obtain sampling kits containing all necessary materials to place one sampler per hole. Due to the nature of the shallow placement (one to three feet, below ground surface), this phase of the field work will be conducted without generating soil cuttings.

The samplers will arrive pre-fabricated from the laboratory contracted to conduct the analysis. Samplers contain hydrophobic adsorbent cartridges to capture the PCE that may exist in soil and groundwater. To install the PSG samplers, Zone 7 will advance one inch diameter holes from one to three feet in depth using a hammer drill, slide hammer, or comparable equipment. The PSG samplers will be installed in the upper portion of each hole, which is sealed with an aluminum foil plug and covered with soil. For locations through asphalt or concrete, a slightly larger diameter hole (1.25" to 1.5") will be drilled through the surface to the underlying soils. From there, the holes will be sleeved with sanitized metal pipes provided in the sampling kit. After the samplers are installed inside the metal pipes, the holes will be patched with aluminum foil plugs and a thin concrete patch at each sample point to protect the samplers. The samplers are exposed to subsurface gas for approximately 14 days.

A two-person team can install approximately 25 samplers per day depending on the number of sample locations that are covered with asphalt, concrete, or gravel surfacing. At this time, Zone 7 will survey the sampler locations in order to accurately delineate the extent of the potential contamination.

For retrieval of the samplers, one person can retrieve approximately 25 samplers per day and patch the holes through the surfacing. It is anticipated that four days will be required to install the samplers and

two days will be required for retrieval and patching of holes. Once the samplers are removed from the subsurface, they will be shipped to the laboratory for analysis.

The data obtained from the sample analyses will be used to help identify source areas of contamination and to delineate the lateral extent of the contaminants. This sampling approach allows for an initially large investigation area to be narrowed down to much smaller areas for continued investigation.

Subtask 2.2: CPT/MIP SURVEY

Further investigation will continue with CPT and MIP. While PSG sampling can help locate the sources of contamination and indicate the lateral extent, CPT and MIP can be used to determine soil characteristics as well as vertical and horizontal contamination. The MIP technology will be used as a screening tool to confirm the presence of PCE in soil and/or groundwater. This data can be used to determine the locations of grab groundwater samples. The MIP probe uses three detectors to determine the presence of VOCs; a flame ionization detector (FID), a photo ionization detector (PID), and an electron capture detector (ECD). In order for the MIP to collect accurate data the probe must stay in contact with the depth interval being analyzed for a minimum amount of time. The waiting time at each probe stop and the advancement interval between probe stops will be adjusted based on the presence and magnitude of the contamination encountered during the survey. Typically, longer stop times and more frequent stops are necessary when contamination is greater. The information gathered for this task will not only determine the location and degree of contamination, but also how the contamination may be moving through soil and/or groundwater.

Zone 7 will contract with a driller for this portion of the field work. The locations and number of borings will be determined using the information from Task 2.1. For planning and budget purposes, 30 distinct CPT/MIP sampling locations are estimated with 60 to 100 feet boring each. Groundwater samples will also be collected during this portion of the field work (see Task 2.3).

The work will be staged such that approximately half of the CPT/MIP Survey locations are completed in one mobilization. This will allow time for the first round of groundwater analytical results to be completed. Depending on laboratory results, the second mobilization can focus effort on locations with evidence of PCE contamination.

Depending on site geology, a 30 ton CPT mounted rig can log an average of 400 to 500 feet of hydrogeologic profiling data per day. Zone 7 will survey borings at the time that the drilling contractor advances each hole. Drilling contractor will be responsible for abandoning the completed CPT borings to the ground surface with bentonite-grout slurry.

Subtask 2.3: GROUNDWATER SAMPLING

The CPT/MIP Survey will assess in-situ PCE concentrations, while groundwater samples can be collected to confirm the data collected in the previous tasks. As stated in Task 2.2, determining the number of sampling areas will depend on results from Task 2.1. Since 30 CPT/MIP sampling locations have been estimated, groundwater sampling will coincide with approximately 60 samples (two samples per boring). Of course, sampling will be conducted in areas likely to be contaminated. Zone 7 will oversee the drilling contractor and will make the groundwater sampling determination in the field during the CPT/MIP Survey activities. As mentioned in the previous task, locations for the groundwater sampling will be surveyed by Zone 7 at the time of the field work.

Subtask 2.4: WELL PROFILING SURVEY OF SUPPLY WELL

The well profiling survey will include an ambient flow profile, ambient groundwater profile, dynamic video survey, dynamic flow profile, and dynamic groundwater profile in the existing supply well that has

been impacted by PCE contamination. All of the surveys will take place in the well without removing the existing pump. The existing pump will be used to provide the dynamic flow. The ambient flow profile and ambient groundwater profile will take place with the well pump off and the groundwater under “static” conditions.

The ambient flow profile survey will use miniaturized underwater lasers that are fired in a wide-beam spread from fiber optic cable emitters at the submerged ends of the fiber optic cables. A ground surface based control unit contains the laser, beam splitter, photon receivers, signal amplifiers, diodes that convert light signals to voltage as well as the laser output and return photonic input channels for the fiber optic cables. With military grade fiber optic cables, laser-beam transmission and photonic emission return to the signal processing unit (SPU). The laser beam wavelength is transmitted at a band width between 540 to 560 nanometers which is the specific spectral band that causes the Rhodamine Red FWT 50 tracer to fluoresce. This data will show how water moves within the well and identify potential pathways between layers of the aquifer.

The ambient groundwater profile will consist of groundwater samples being collected at various points along the screened interval to calculate how much contamination is entering the well at different zones of ambient flow. The groundwater samples will be collected using nylon 1/4-inch down-hole tubing connected to a high-lift gas displacement down-hole pump driven by pressurized nitrogen gas. Groundwater samples will be bailed to reduce volatilization of the sample and placed into the appropriate laboratory supplied containers and placed on ice until they were delivered under chain-of-custody protocol to Zone 7's laboratory using procedures discussed in Attachment 8 Quality Assurance.

The dynamic video survey, dynamic flow profile, and dynamic groundwater profile will all take place with the existing well pump running. The video survey will be conducted using a 3/4" (OD) video camera. The purpose of the miniature camera survey is to view the condition of the well during pumping. Some conditions the survey can identify are: pinpoint where sand invasion comes, find cavitation of the screens and can be used to profile the entire zones for the maintenance or prior to rehabilitation of the wells. Because the existing well was installed in 1949 this video survey can assess the current condition of the well.

The dynamic flow profile will consist of injecting small volumes (20 ml to 60 ml) of rhodamine dye (FWT 50) along vertically spaced centers within a production, injection, ASR, monitoring well or borehole. The dye is NSF 60 Approved for use in potable drinking water wells. Release of the dye is controlled by an electro-pneumatic injection process where the energy from a pneumatic load is converted to a hydraulic load inside the injection tubing which contains the dye. When the hydraulic load inside the dye tube exceeds the spring force inside the injection nozzle, a small quantity of dye is released into the surrounding well water. The same process is repeated at each injection depth. The time (T0) is marked for each injection and the peak return (PR) time of the dye to a ground surface based fluorometer (TPR) is marked as well. Knowing the travel time for each dye peak return and knowing the depth-distance between each pair of consecutive injection points allows a flow velocity (d/t) to be calculated between each pair of injection points. Cumulative flow (Qn) is then calculated by multiplying the flow velocity (Vn) by the cross sectional surface area (An) of the well at each vertical injection point.

The dynamic groundwater profile will consist of groundwater samples being collected at various points along the screened interval to calculate how much contamination is entering the well at zones of relatively elevated flow during pumping conditions.

WASTE HANDLING

The proposed project will not generate a significant amount of waste. The small amount of waste generated during field activities will be contained and disposed by the drilling contractor. This disposal cost is included in the contractor's cost estimate.

TASK 3: DATA MANAGEMENT/INTERPRETATION

Subtask 3.1: LABORATORY ANALYSES

Samplers from the PSG Survey will be shipped to the selected PSG contractor for analysis. The samplers will be analyzed using gas chromatography/mass spectrometry (GC/MS) instrumentation, following EPA Method 8260C.

Groundwater grab samples collected for PCE analysis by EPA Method 502.2 or 524.2 will be analyzed by Zone 7's Water Quality Laboratory (ELAP Certified).

Subtask 3.2: DATABASE MANAGEMENT

Zone 7 uses a proprietary database and Geographical Information Systems (GIS) program, GIS\Key, specifically designed for storing and presenting environmental and geologic data (<http://www.giskey.com/core.htm>). All data collected from the borings and wells installed and tested for this project will be entered into Zone 7's GIS\Key database. This includes:

- Lithologic data from boring logs
- Borehole geophysics
- Surveyed locations and elevations
- Water levels
- Water quality analytical data

After the completion of the project water levels and water quality analytical data from program sampling will continue to be added to the GIS\Key database.

Subtask 3.3: MAP VERTICAL AND AREAL PCE DISTRIBUTION

The lithological data collected along with existing data will be used to create cross-sections across the project area. The verified PCE data will be added to the cross-sections to show the vertical distribution of the contamination. In addition, the PCE contamination will be plotted on the GIS base map to show the areal distribution. If possible, contour lines will be added.

Subtask 3.4: PROGRESS MEETINGS WITH RWQCB AND PROPERTY OWNER

Zone 7 will schedule and conduct progress meetings with staff from the RWQCB and the property owner. While the work is underway, Zone 7 will discuss the progress of the project, intermediate results, and next steps. Once the work is complete, a subsequent meeting will be scheduled to discuss findings, interpretations, and conclusions.

TASK 4: PROJECT MANAGEMENT/PUBLIC OUTREACH

Subtask 4.1: PROJECT MANAGEMENT

This task includes the general management of the project including the coordination of the contractors with Zone 7. Prior to the start of the project, a kick-off meeting will be held to highlight the goals of the project with all parties involved. During the project, daily field logs will be submitted by the contractors to track the progress of the project. As data is collected it will be reviewed and analyzed by Zone 7 staff to ensure that the goals of the project are being met. The schedule and budget will be tracked by the Zone 7 Project Managers.

Subtask 4.2: PUBLIC OUTREACH

At the beginning of the project, Zone 7 will present a project outline at a Zone 7 Board meeting. A project update will be reported to the Board at another publically notified Board meeting following completion of the field work. Upon completion of the project, a final report describing the project results will be presented at the Board meeting.

A page on Zone 7's website will be created that will describe the project details and report status of the project as it progresses. Information about this web page will be made available at the Board meeting and a link to the web page will be displayed on the Zone 7 Home Page. The web page will be updated with project results as they become available and will include electronic versions of any project updates and the final project report as they become available.

Subtask 4.3: SCHEDULE AND BUDGET MANAGEMENT

The project will be managed using the budget and schedule outlined in Attachments 6 and 7. Budget information will be tracked by the project manager using Zone 7's accounting system. The reports generated will be compared with the forecasted budget.

The proposed project schedule has been generated in Microsoft Project and is included in Attachment 7. Prior to the start of the project a baseline schedule will be set. The actual schedule will continue to be updated as the project proceeds and milestone are met. The schedule and budget will be reviewed weekly and if they are not on track, corrective actions will be taken.

Subtask 4.4: INFORMATION DISSEMINATION

The project results will be presented in a Summary Report following the investigation. The Report will be presented to the Zone 7 Board of Directors and the public at a public Zone 7 Board of Directors' Meeting, which are held once per month, and announced on the Zone 7 website. Zone 7 will also send copies to all interested parties and stakeholders including the City of Pleasanton and Alameda County Department of Public Health. Zone 7 will also offer to present an overview of the work and the findings to them should they desire to discuss the findings and the future plans.

Subtask 4.5: PROJECT DELIVERABLES

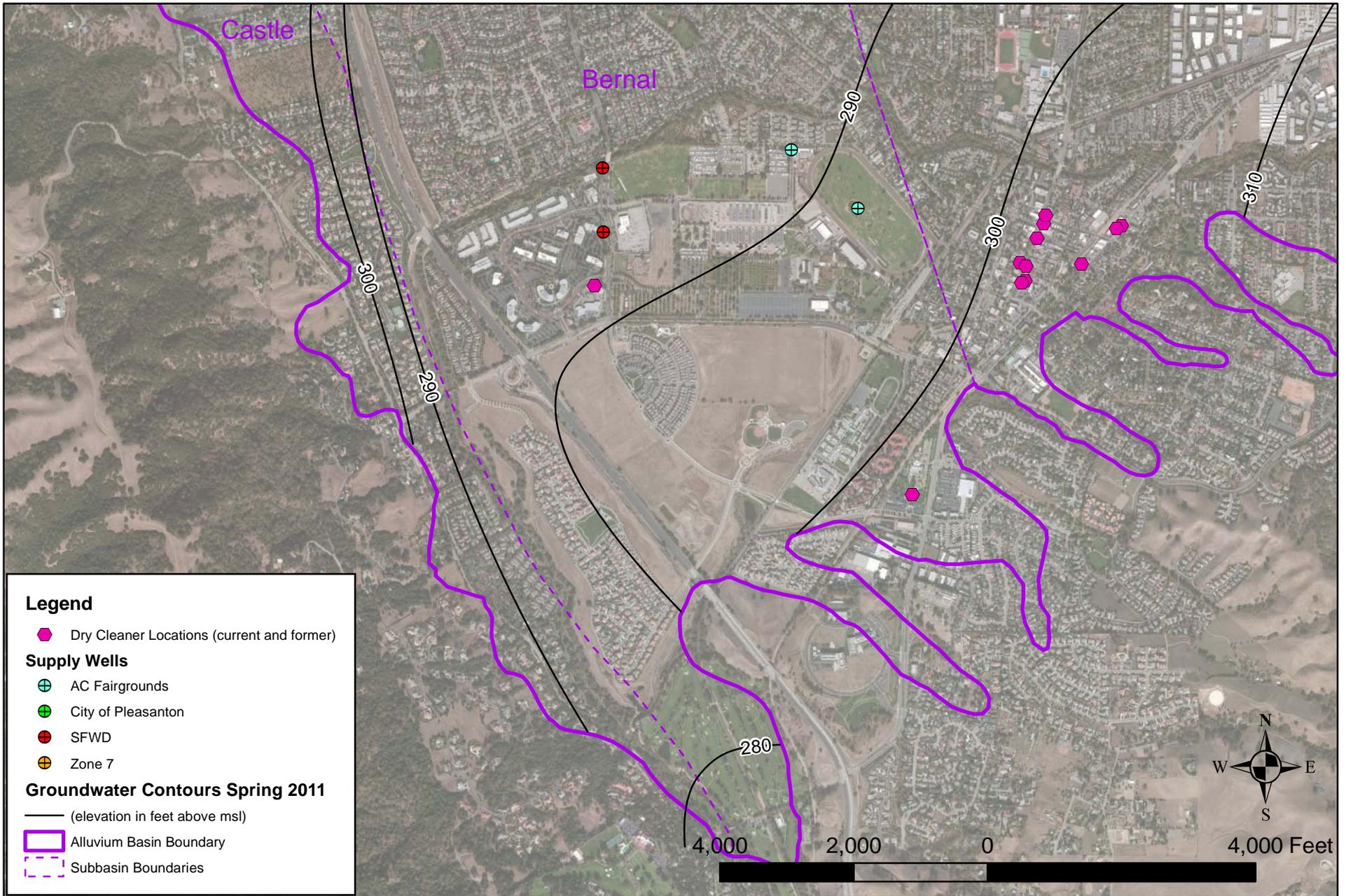
Since the expected project schedule is 10 months, Zone 7 will submit three quarterly reports and a final report to DWR. The quarterly reports will give a detailed account on the progress of tasks outlined in the Work Plan. Additionally, Zone 7 will include information regarding budget and demonstrate that the grant funding is being utilized per the requirements set forth by DWR.

Upon completion of the project, Zone 7 will prepare a final report that will include all data, permits, field notes, well logs, development logs, and chemical analyses.

The final report will be a comprehensive document that will include a summary of all costs, and a detailed description and analysis of project results. The final report will also contain all of the information specified in the grant agreement and will follow QA review process at Zone 7.

LIST OF FIGURES

Figure 1: Project Area



ZONE 7 WATER AGENCY
 100 North Canyons Parkway, Livermore, CA

DRAWN: CW

REVIEWED: MK

File:
 E:\PROJECTS\LGAGrantStudy2012-PCE\Att5_LGA12_Z7WA2_WrkPln_2of2.mxd

Project Location Map
Pleasanton, CA

Scale: 1 in = 2,000 ft

Date: 7/12/2012

FIGURE ATT 5-1